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Objectives

- Study the spread and persistence of MRSA (methicillin-resistant *Staphylococcus aureus*) within a pig herd
- Examine short and long term consequences and cost-effectiveness of different potential control strategies

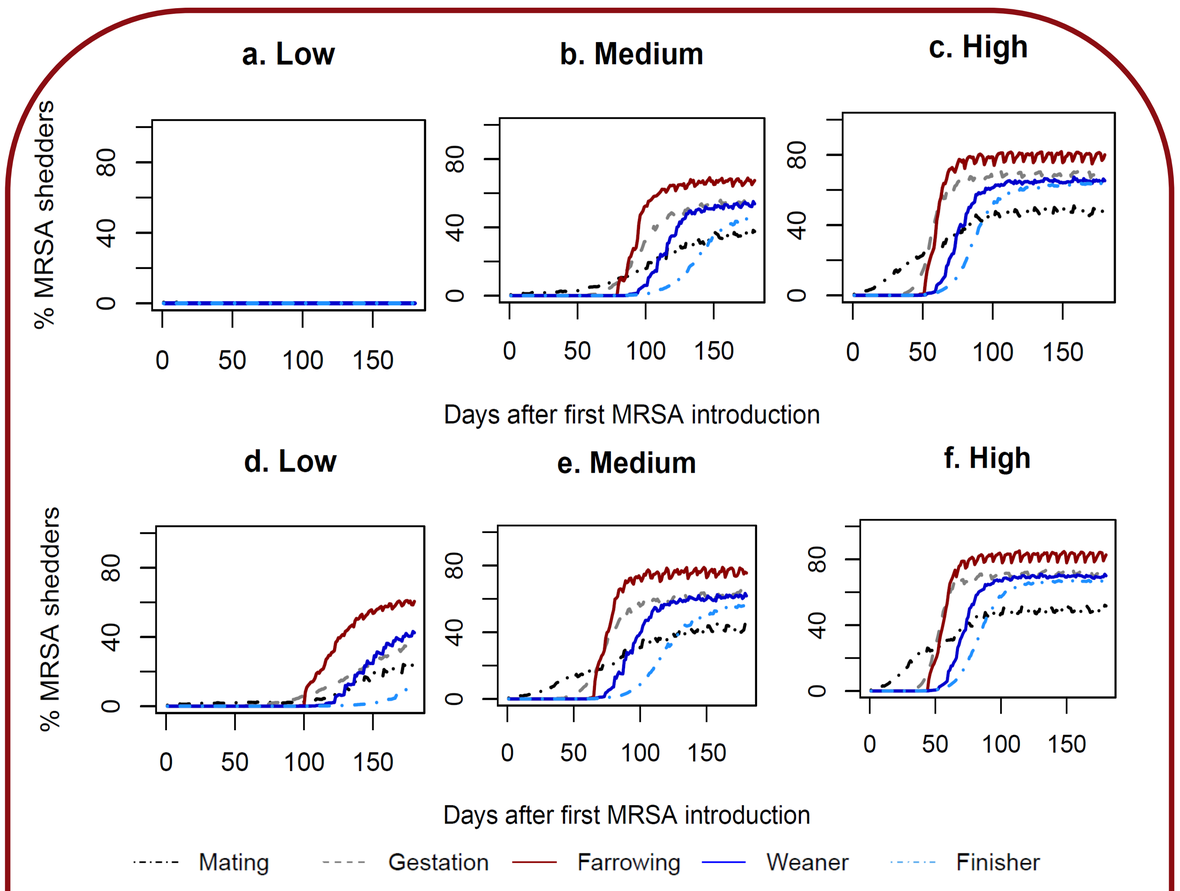

Fig.1: Median simulated proportion of MRSA shedders after introduction of one intermittent (a-c) or persistent shedder (d-f) in the mating unit under low*, medium* and high* transmission of MRSA

*Rates calculated from Broens et al. (2012). High: Use of tetracyclines or β- lactams for min. one pig/pen, Low: No use of these, Medium: Average of low + high

References

Broens, E.M., Espinosa-Gongora, C., Graat, E.A.M., Vendrig, N., Van Der Wolf, P.J., Guardabassi, L., Butaye, P., Nielsen, J.P., De Jong, M.C.M., Van De Giessen, A.W., 2012. Longitudinal study on transmission of MRSA CC398 within pig herds. BMC Vet. Res. 8, 58. doi:10.1186/1746-6148-8-58

Material and methods

- A mechanistic individual-based simulation model was built in R
- Herd model: A medium-sized Danish farrow-to-finish herd
- Infection model: SIS model with two different 'infectious stages': Intermittent or persistent MRSA shedder
- Due to uncertainty, all scenarios were modelled with three different sets of transmission rates ('low', 'medium', 'high'), estimated based on Broens et al. (2012)

Key observations

- Development over time after introduction (Fig. 1): Spread of MRSA was mainly following the movement of pigs between stable units
- Following introduction of lower numbers of intermittent shedders, MRSA would frequently fade out (Fig.1.a + Fig. 2.a)
- After spread of MRSA has reached an equilibrium, the prevalence of MRSA shedders would be highest in the farrowing unit (Fig. 2), independent of how MRSA was introduced

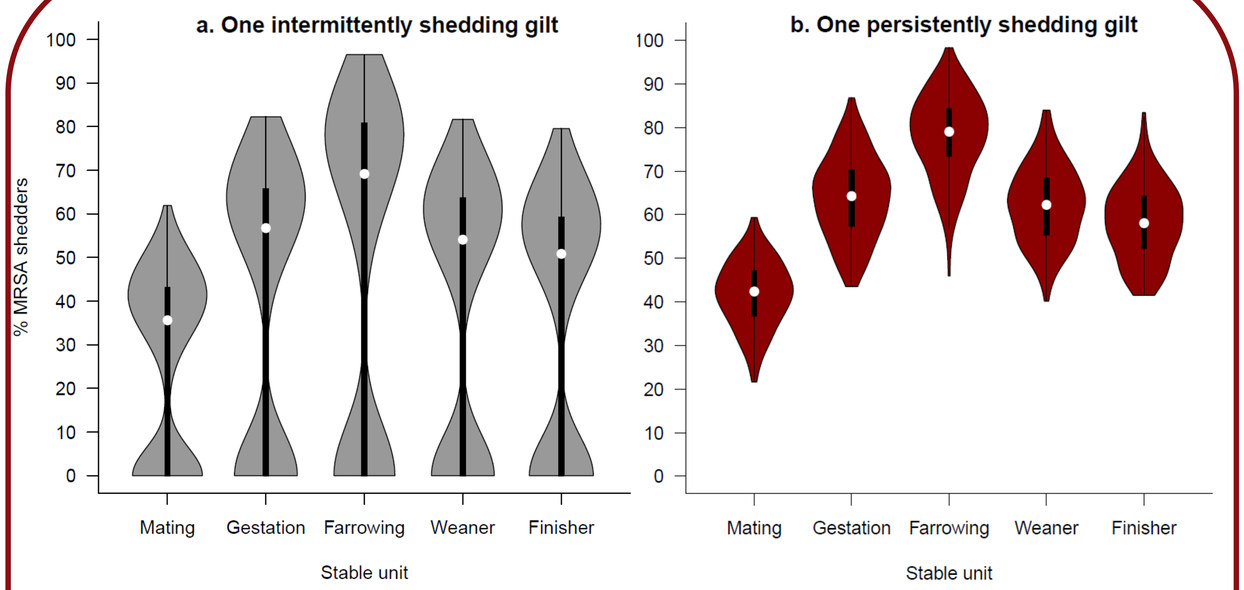

Fig. 2: Simulated proportion of MRSA shedders in the five stable units, six years after introduction of one intermittently (left) or persistently (right) shedding gilt, using medium transmission rates and 500 iterations

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